

In re application: Hwang
Filed: 03/28/2001
Response Dated 05/09/2003

PAGE 7 OF 9

Serial No.: 09/820,072
Attorney's Docket: PAT004US
Reply to Office action of 03/11/2003

REMARKS/ARGUMENTS

Claims 1-15, 35-36, and 39-45, and new claims 46-49 are pending in this application. Claims 1-15, 35-36, and 39-45 have been rejected. The independent claims 1 and 35 and various dependent claims have been amended, and claims 46-49 have been added, to more particularly point out and distinctly claim the subject matter of the present invention. Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

Applicant's undersigned attorney Kinsella would like to thank Examiner Nguyen for his courtesy in a telephone conference with the undersigned and inventor Hwang on May 9, 2003.

On pages 2-4 of the final Office Action, the Examiner rejected claims 1-15, 39-41, and 43-45 under 35 U.S.C. § 102(e) as being anticipated by Hwang et al., U.S. Pat. No. 6,406,795. On pages 4-5 of the Office Action, the Examiner rejected dependent claim 42 under 35 U.S.C. § 103(a) as unpatentable in view of Hwang et al., as applied to claim 35.

Applicant notes that independent claim 35 and dependent 36 are pending in the application, although the Examiner did not list these by name on the Office Action cover sheet nor in the rejections listed in the Office Action. Since claims 39-41 and 43-45 depend variously from independent claim 35, Applicant assumes this was a typographical error on the part of the Examiner, and that the Examiner intended to reject claims 35-36 based on Hwang. Applicant requests the Examiner to correct the PTO records in this regard and to reflect that claims 35 and 36 are pending.

Applicant notes that the present Application and the application that matured into the Hwang et al. patent were and are owned by the same entity (namely, Applied Optoelectronics, Inc.). Accordingly, by virtue of 35 U.S.C. § 103(c), the Hwang et al. reference cannot preclude patentability under 35 U.S.C. § 103, because it is (at most) available as prior art only under 35 U.S.C. § 102(e). Accordingly, Applicant submits that the § 103 rejection of claim 42 is improper.

Regarding the § 102(e) rejections, the Examiner stated that Hwang et al. teaches in Fig. 2 that the bonding interface 16 is solid at room temperature and in liquid like form above room temperature, thus anticipating the independent claims 1 and 35. In said telephone conference, the

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PAGE 8 OF 9

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Examiner explained that the bonding interface "layer" of Hwang et al. would melt at some temperature, and thus melted "above room temperature," and therefore was covered by the claims.

Independent claims 1 and 35 have been amended to more particularly point out and distinctly claim the subject matter of the present invention. Various depending claims have been amended, and new dependent claims 46-49 have been added, to more particularly point out and distinctly claim the subject matter of the present invention. Independent claims 1 and 35, for example, now specify that the interfacial bonding layer (a) is solid at approximately 100°C, and (b) acquires a liquid-like form at a bonding layer melting point lower than the melting points of the surrounding materials, i.e. the base substrate and the thin film adaptive crystalline layer. Various dependent claims specify that the bonding layer melting point is less than particular temperatures, e.g. approximately 600°C, while still solid 100°C. Because the interfacial bonding layer becomes liquid at a temperature at which the surrounding semiconductor materials are still solid (because it is lower than their melting point), then the floating substrate approach of the invention can be employed by heating the material during epitaxial growth to above the bonding layer melting point but below any melting point of the substrate or thin film adaptive crystalline layer. Thus, when the interfacial bonding layer is in liquid-like form, the thin film adaptive crystalline layer is able to expand or contract its lattice constant along a direction parallel to a surface of the substrate.

Hwang et al. does not teach an interfacial bonding layer with these properties. Hwang et al. teaches that when two semiconductor materials (e.g., Si, GaAs, InP, InGaAs, GaP; col. 3, lines 40-45) are joined together, e.g. by Van Der Waals force, hydrogen bond, covalent bond, ionic bond, etc., there is a bonding interface at the location of the joining (Hwang et al., Figs. 3, Fig. 3E, and col. 4, lines 35-55, col. 5, lines 2-27). If the materials joined form a very thin interface layer (e.g., one atomic layer or a few hundred angstroms, col. 3, lines 37-40), it will not have a melting point lower than that of the semiconductor materials from which it is formed, nor lower than particular melting point maximums specified in the dependent claims, e.g. 600°C.

For these reasons, Applicant submits that the independent claims, as amended, are not anticipated by Hwang et al., and that independent claims 1 and 35, and their variously-dependent claims, should be placed in condition for allowance.

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PAGE 9 OF 9

Serial No.: 09/820,072
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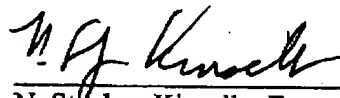
The Assistant Commissioner for Patents is hereby authorized to charge any additional fees or credit any excess payment which may be associated with this communication to our deposit account 50-1705.

In view of the foregoing remarks and amendments, claims 1-15, 35-36, and 39-45, as variously amended, and new claims 46-49, are believed to be in condition for allowance. Allowance of the pending claims at an early date is earnestly solicited.

The undersigned may be contacted for any questions.

Respectfully submitted,

Date: 5-9-03



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